

Assignment: Statistics and Probability

(Max.Marks:20)

(Note: To be submitted by Sunday 11:59pm

In *SeatNumber-Name-Course#-M/E.docx form at my
email:muddin@uok.edu.pk)

Q1a) Define Statistics by giving examples.

b) In the given data, we measure the length of 50 neem leaves.

5.5 6.1 5.9 6.2 6.3 5.7 5.9 5.4 5.5 5.9
6.3 5.7 5.5 6.4 6.0 6.6 5.6 6.1 6.9 5.9
6.0 5.1 6.7 6.0 6.2 5.5 6.4 6.9 6.2 6.2
5.3 5.6 6.0 5.4 5.2 5.5 7.0 5.8 6.3 4.9
5.6 5.5 6.0 6.7 6.8 5.8 5.7 6.0 6.1 7.2

- Construct a stem-and-leaf plot and find the value of the median from it.
- Comment on the shape of the distribution.

Q2 The number of road accident reported by Police per day for last two months.

3	36	12	12	18	2	11	17	19	18
9	10	11	15	51	14	38	1	25	16
11	7	37	8	8	28	14	26	23	1
17	6	39	2	14	57	24	8	0	38
5	5	40	19	25	15	28	3	2	21
18	7	25	19	25	39	28	3	15	21

- Construct a frequency distribution
- Constructing a histogram
- Comments on the shape of distribution
- As insurance person, what you understand for your Motor Department.

Q3 Consider the frequency distribution of the length of snakes measured in cms.

Class Interval	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84
Frequency	7	8	12	26	34	42	40	15	17	9

- Find the relation between Mean, Median and Mode.
- Write comments on the nature of the distribution.
- Calculate the skewness and Kurtosis and write comments on the nature of the distribution.
- Construct a Histogram and superimpose on it a frequency curve.
- Discuss the shape of the distribution with the results obtained in part (a) to (d).

Q.4 The following data is incomplete,

C-I	Freq.	Relative Frequency	Cumulative Freq. (Less than)
6-8	-	-	-
8-10	23	-	29
10-12	-	0.34	-
12-14	17	0.17	-
14-16	-	-	92
16-18	-	-	-
Total	100	1.00	-

Find the missing entries and also calculate the Quartile deviation.

- Q.5 a)** Explain with suitable examples the term ‘dispersion’ . State the relative and absolute measures of dispersion and describe the situations for using these measures.
- Q.5 b)** Mean of the 6 numbers 6,9,3,2,x ,y is 6 and the variance is 10. Find the value of ‘x’ & ‘y’.
- Q.6a)** What is Conditional probability? Explain with the help of an example.
- b) Let A and B be the two possible outcomes of an experiment and suppose $P(A) = 0.4$, $P(A \cup B) = 0.7$, and $P(B) = p$.
- For what value of p , are A and B mutually exclusive?
 - For what value of p , are A and B independent?
 - If A and B are independent events then prove the followings:
 - A' and B are independent
 - A' and B' are independent.

Q.7 The following function of the random variable “x” is given by:

$$f(x) = \begin{cases} C/x^5 & ; x \geq 1 \\ 0 & ; x < 1 \end{cases}$$

- What is the value of c ?
- Plot the pdf and cdf.
- Find $E(X)$
- What is cdf of X
- Find the value of “M” (median).

Q8. The random variable ‘X’ representing the number of errors per 100 lines of software code has the following pdf.

x	2	3	4	5	6
f(x)	.01	.25	.4	.3	.04

- Find mean and variance of X .
- Find mean and variance of $Z = 3X-2$.

Q9.a) Determine the value of C so that the given function is pdf.

$$f(x) = C(x^2 + 4) \quad ; \quad x=0,1,2,3$$

b) The cumulative distribution function of X is

$$F(x) = \begin{cases} 0 & x < 1 \\ 0.4 & 1 \leq x < 3 \\ 0.6 & 3 \leq x < 5 \\ 0.8 & 5 \leq x < 7 \\ 1 & x \geq 7 \end{cases}$$

- What is the pmf of X ?
- Find $P(4 < x < 7)$.

Q.10a) Ten percent of the population is left-handed. Use the normal approximation to the Binomial distribution to find the probability that there are at least 60 left-handed students in a school of 400 students.

- b) Plot the following Normal Curves on the same graph paper and give comments on the shape of the curve for different values of parameters.
- $N(\mu=10, \sigma^2=2)$
 - $N(\mu=10, \sigma^2=4)$
 - $N(\mu=15, \sigma^2=2)$